Art. XII.—*New or Little-known Victorian Fossils in the National Museum.*

Part XX.—Some Tertiary Fish-teeth.

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(With Plate IX.).

(Read December 14th, 1916),

Introduction and Summary.

The series of fossil remains now described, although small, is especially noteworthy on account of the rarity of the specimens. The following genera are represented :—

CARCHAROIDES.—Instituted in 1901 by Ameghino for selachian teeth from the Patagonian Tertiary, having the dual characters of *Lamna* and *Carcharodon*. They have now been found at two Janjukian localities in Victoria, thus affording an additional link in the evidence of the contemporaneity of the South American and Victorian strata.

ODONTASPIS.—One of the largest Tertiary species of the type of the living Bull-shark is *O. elegans*, here noted in detail, and first recorded, but without locality, from Victoria by McCoy.

PRISTIOPHORUS.—The side-gilled saw-fish is almost unique amongst fossils. Its rostral teeth are here shown to occur in the Tertiaries of Victoria and New Zealand.

PRISTIS.—The teeth of this sawfish were unknown in the Southern Hemisphere, although several species have been recorded from Tertiary deposits in England and North America. The Victorian fossils appear to be most nearly allied to the Mediterranean species, Pristis antiquorum, and not to the Indian and Australian form.

MYLIOBATIS.—This is the first recorded occurrence of the genus in undoubted Victorian Miocene beds; the oldest example hitherto known occurring in the Mallee at

about the junction of the Miocene and Lower Pliocene (Janjukian and Kalimnan).

SARGUS.—A representative of this genus is common in the Miocene of New Zealand, but this is its first occurrence in Victoria, in beds of similar age.

Description of Specimens.

PISCES.

Fam. Carchariidae.

Genus **Carcharoides**, Ameghino.

Carcharoides totuserratus, Ameghino. (Plate IX., Figs. 1 and 2.)

Carcharoides totuserratus, Ameghino, 1901, Bol. Acad. Nac. Cienc. Cordoba, vol. XVI., p. 102. Idem, 1906, "Les Formations Sedimentaires du Crétacé Supérieur et du Tertiaire de Patagonie." Anales del Museo Nacional de Buenos Aires, ser. III., vol. VIII., p. 183 (footnote), and woodcut, fig. 50. Chapman, 1913, Vict. Naturalist, vol. XXX., pp. 142, 143.

Description.—The teeth of the Victorian specimens are, like those from Patagonia (of Patagonian age), of moderate size. The base is strong, but not so stout or heavy in proportion as in a tooth of the genus *Carcharodon*, but more akin to that of *Lamna*, and angularly inarched. The crown is strong and slightly and obliquely curved; apex sharp. External face depressed-convex, with a weak median sulcus extending for about 3 mm. from the junction of the base upwards. Internal face depressed-convex. Lateral cusps blunt in Ameghino's type, but acute in well-preserved specimens, as that from Torquay. Edges of crown and lateral denticles compressed, thin and bluntly serrate, the serrations varying from mere crenulae to stout serrations. Edge view of crown shows a slight flexure.

Dimensions.—Ameghino's type. Total length, 26 mm. (crown, 18 mm.; base, 8 mm.). Width of crown at base, not including cusps, 10 mm.; thickness, 4 mm.

Specimen from Torquay. Total length, 24 mm. Width at base, 15.25 mm. Length of crown, 17 mm. Width of crown, 9 mm. Thickness of crown, 3 mm. Height of lateral denticles, 4.25 mm.; width, 3.25 mm.

Specimen from Waurn Ponds. Total length, 22 mm. Length of crown, 19 mm. (base imperfect). Width of crown at base, 9.75 mm. Thickness, 3.5 mm.

Observations.—When complete, this type of tooth is seen to be distinct from *Lamna*, *Carcharias* (*Prionodon*) or *Carcharodon*. From the former it differs in its serrated edges, and from the two latter genera in the shape of the base and the presence of lateral denticles.

Occurrence.—Tertiary (Janjukian). Waurn Ponds, near Geelong; pres. by Mr. S. R. Mitchell (tooth consisting of crown and part of base), W. of Rocky Point, Torquay. (A nearly perfect specimen in excellent preservation, showing the crown and two lateral denticles, with a part of the base.) From the collection of the late Dr. T. S. Hall, M.A.

Carcharoides tenuidens, Chapman. (Plate IX., Fig. 3.)

cf. *Carcharias* (*Prionodon*) *acutus*. non Agassiz, Chapman and Pritchard, 1904, Proc. Roy. Soc. Vict., vol. XVII. (N.S.), pt. I., p. 274.

Carcharoides tenuidens, Chapman, 1913, Victorian Naturalist, vol. XXX., pp. 142, 143, and woodcut. Idem, 1914, Australasian Fossils, p. 270, fig. 131A.

Description.—Holotype. Tooth of slender habit. Root slightly arched and moderately stout. Crown acutely triangular, flattened on the outer face near the junction with the root, and otherwise depressed convex; inner face roundly convex; edge view showing a wide recurvation of the lateral line, as in *Odontaspis*. Edge crenulate, with blunt serrae. Lateral denticles well developed, sharp, and turned towards the crown.

Dimensions.—Total length from base to apex, 20.25 mm. Extreme width at base of root, 12 mm.; thickness, 4.5 mm.; width of crown at junction with root, 7.25 mm.; thickness, 3.75 mm. Length of lateral denticle, 3.75 mm.

Observations.—The serrated crown from Waurn Ponds described by Dr. Pritchard and myself in 1904, and doubtfully referred to *Carcharias* (*Prionodon*) *acutus*, Ag. appears to belong to the above species, with which it agrees in its narrow crown and acute apex, as distinguished from that of the preceding species, *C. totuserratus*, which has a broader crown.

Occurrence.—Tertiary (Janjukian). Waurn Ponds Quarry. Type specimen collected and presented by Mr. J. F. Mulder. An imperfect tooth (crown only), from J. F. Bailey coll.; same locality.

Fam. Limnidae.

Genus **Odontaspis**, Agassiz.

Odontaspis elegans, Agassiz sp. (Plate IX., Fig. 4.)

Lamna elegans, Agassiz, 1843, Poissons fossiles, vol. III., p. 289, pl. XXXV., figs. 1-5 (non figs. 6, 7); pl. XXXVIIa., fig. 59 (non 58). R. W. Gibbes, 1849, Journ. Acad. Nat. Sci. Philad., ser. 2, vol. I., p. 196, pl. XXV., figs. 98-102 (? figs. 96, 97). Dixon, 1850, Foss. Sussex, p. 203, pl. X., figs. 28-31. McCoy, 1867, Ann. Mag. Nat. Hist., ser. 3, vol. XX., p. 192. Id., 1874, in Brough Smyth's Prog. Rep. No. I., p. 35. Johnston, 1877, Proc. R. Soc., Tas., for 1876, p. 86.

Lamna huttoni, Davis, 1888, Trans. Roy. Dubl. Soc., ser. 2, vol. IV., p. 15, pl. III., fig. 1.

Odontaspis elegans, Ag. sp., Smith Woodward, 1889, Cat. Foss Fishes, Brit. Mus. (Nat. Hist.), pt. I., p. 361.

This species of *Odontaspis* is perhaps the rarest of the genus in Victoria. It did not occur in the series of Australian Tertiary fish-teeth examined by Dr. G. B. Pritchard and myself in 1904, but was recorded by McCoy in 1867 under the name of *Lamna elegans* from Victorian Miocene beds, and was also noted by R. M. Johnston from Tasmania in his "Notes on the Tertiary Beds of Table Cape."

It is readily distinguished from the other Australian species of *Odontaspis* by its stouter build and strong divergent roots. There is little doubt that this world-wide species is also represented in New Zealand by Davis' *Lamna huttoni*, the type of which has a rather long crown, gently but sinuously reflexed. The Victorian specimens are destitute of lateral denticles, owing to attrition or partial decay of the base.

Occurrence.—Tertiary (Janjukian). Waurn Ponds, near Geelong. Fyansford Hill, near Geelong. Presented by Miss Lenna Bryan.

Fam. Pristiophoridae.

Genus **Pristiophorus**, Müller and Henle.

Pristiophorus lanceolatus, Davis sp. (Plate IX., Fig. 5.)

Lamna lanceolata, Davis, 1888, Trans. R. Dubl. Soc., ser. 2, vol. IV., p. 20, pl. III., figs. 12*a-d*.

Observations.—The fossil fish-tooth figured by J. W. Davis as cited above has long been a puzzle as to its real relationship. That

author himself was dubious about referring it to *Lamna*. Dr. A. S. Woodward, in his "Catalogue of Fossil Fishes,"[1] remarks upon it as follows:—

"The so-called *Lamna lanceolata*, J. W. Davis (Trans. Roy. Dublin Soc., 2 vol. IV., 1888, p. 20, pl. III., fig. 12), from New Zealand, is founded upon a tooth evidently not Selachian."

Whilst studying the structure of the rostral teeth in the living *Pristis* and allied genera, I was struck with the resemblance of Davis's fossil with the teeth of the Hobson's Bay Saw-shark, *Pristiophorus*. Their generic identity was confirmed from the following features common to both. The flattened crown of the tooth is equally, slightly convex on both surfaces. The base of the tooth is not furnished with a definite semi-calcified root as in *Lamna*, but appears to be torn from its base, suggesting a cartilaginous attachment. The tooth curves gently backwards, and at its junction with the basal cartilage the osteodentine is clearly marked off from the base. This line of attachment bends down to the anterior margin in both living and fossil species. The hollow root of the fossil teeth further indicates a hollow or membranous base seen on the rostral margin of the living *Pristiophorus*.[2]

The teeth of *Pristiophorus lanceolatus* are closely comparable to those of *P. nudipinnis*, Günther,[3] (Pl. IX., fig. 6), a saw-fish found in Hobson's Bay, Port Phillip, with these differences:—

The fossil specimens are larger, stouter and more strongly curved. The size of the Victorian specimen indicates a fish of about four and a-half feet long, whilst that from New Zealand would have been about six feet or more.

The genus *Pristiophorus* is rare in the fossil condition, being only represented by some detached vertebrae from the Molasse of Baltringen, Würtemberg,[4] and by an undescribed form from the Upper Cretaceous of Mount Lebanon (Smith Woodward).

J. W. Davis's specimen came from the Oamaru series at Castle Hill Station, Canterbury, N.Z.

Occurrence.—Tertiary (Kalimnan). Beaumaris. Pres. by Mr. F. A. Cudmore.

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1 Part i., 1889, p. 410.

2 In working out the relationships of this and other fossil specimens I have been kindly assisted by Mr. J. A. Kershaw, F.E.S., Curator of the Museum, who has given facilities for examining recent specimens.

3 Günther. Cat. Foss. Fishes, Brit. Mus., vol. viii., 1864, p. 432. McCoy, Prod. Zool. Vict., vol. i., 1885, pl. lvi., fig. 2.

4 Hasse, C. "Das natürl. Syst. Elasm., Besond. Theil," p. 103, pl. xiii., figs. 6, 7.

Fam. PRISTIDAE.

Genus **Pristis**, Latham.

Pristis cudmorei, sp. nov. (Plate IX., Fig. 7).

Description.—Dermal teeth of rostrum, flattened-conical and curved; bluntly pointed. Inner, concave edge rounded; the convex margin cultrate. Base nearly straight across, but slightly hollowed below, the surface in contact with the cartilaginous socket of the rostrum being roughened for attachment. Surface of tooth even but for a few longitudinal grooves around the base. The surface of the tooth when magnified shows numerous longitudinal striae, very fine and distinct.

Dimensions of Holotype.—Length of tooth, 17.5 mm.; width at base, 7.5 mm.; greatest thickness, 4 mm. The smaller specimen has a length of 15 mm.

Observations.—None of the fossil forms about which I have been able to gather details show any decided resemblance in shape to the above specimens, excepting *Pristis ensidens*, Leidy,[1] from the Miocene phosphate beds of South Carolina, but this form has a straight-sided tooth which is broader at the base. Undoubtedly the nearest representative is the living *Pristis antiquorum*, Latham, found in the Mediterranean and the warmer parts of the Atlantic. The teeth of the rostrum in this species are almost identical in shape, especially the anterior teeth, the only difference being the coarser striae on the teeth of the living species. Strangely enough, the Indian and Australian species (*P. zysron*, Bleek) has dermal teeth of a very different type, they being thick, long and straight, and with a coarse, fibrous structure near the base.

Occurrence.—Tertiary (Kalimnan). Beaumaris, Port Phillip. Two teeth referred to the above species were found by Mr. F. A. Cudmore, after whom the species is named, in recognition of his many interesting palaeontological discoveries.

Fam. MYLIOBATIDAE.

Genus **Myliobatis**, Cuvier.

Myliobatis moorabbinensis, Chapman and Pritchard. (Plate IX., Fig. 8.)

Myliobatis moorabbinensis, Chapman and Pritchard, 1907, Proc. R. Soc., Vict., vol. XX. (N.S.), pt. I., p. 60, pl. V., figs. 1-3.

1 Journ. Acad. Nat. Sci. Philad., ser. 2, vol. viii., 1877, p. 252, pl. xxxiv., figs. 31, 32.

Chapman, 1914, ibid., vol XXVII. (N.S.), pt. I., p. 57, pl. X., fig. 57.

Observations.—The median palatal teeth referred to under the above name all differ in being more depressed, and having more closely set denticles than those of the living *Myliobatis australis*, Macleay.

M. moorabbinensis has been previously found in the Kalimnan of Beaumaris; and in the borings in the Mallee ranging from Janjukian to Kalimnan.

The tooth from Torquay is even more slender and depressed than the Beaumaris specimens, but evidently belongs to the same species. This is the earliest appearance of the genus in our Tertiary beds.

Occurrence.—One example from the Tertiary (Janjukian). Bird Rock Cliffs, Torquay, near Geelong. Pres. by Mr. W. J. Parr.

Fam. Sparidae.

Genus **Sargus**, Cuvier.

Sargus laticonus, Davis. (Plate IX., Fig. 9.)

Sargus laticonus, Davis, 1888, Trans. R. Dubl. Soc., Ser. 2, vol. IV., p. 43, pl. VII., figs. 3-8.

Observations.—This genus and species has not been recorded previously from the Australian Tertiary strata, although it is a well-known fossil in the New Zealand Oamaru system. It is there found with some frequency in the limestone beds of Coleridge Gully, Broken River, Castle Hill, Trelissic and Canterbury. It is especially interesting to find this fossil in our Batesford fauna, since the writer has more than once referred this series to a similar period as the Oamaruian.

The specimen here figured is one of the anterior cutting teeth, and is exceptionally broad, but not unlike Davis's figure 7 on pl. VII. of his paper.

Occurrence.—Tertiary (Janjukian). Limestone quarries, Batesford, near Geelong. Pres. by Mr. D. Culliney.

EXPLANATION OF PLATE IX.

Fig. 1.—*Carcharoides totuserratus*, Ameghino. 1*a*, external face; 1*b*, internal face. Tertiary (Janjukian). Torquay. T. S. Hall coll.

,, 2.—*Carcharoides totuserratus*, Amegh. Internal surface of tooth. Tertiary (Janjukian). Waurn Ponds, near Geelong. Pres. S. R. Mitchell.